Data Interpretation, Reporting & Taking Action

BPN Training Module 4

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Data Interpretation, Reporting and Taking Action

This series of guidance documents aims to help anyone involved in a building project to understand what Building Performance Evaluation is and how it can increase occupant satisfaction, lower environmental impact, and reduce risk.

There are 5 separate training modules. A fuller description of all of these is provided in Module 1.

Module 1 - BPE: What, why and the benefits that it brings

Module 2 - Planning a BPE: Where to start and common techniques

Module 3 - Undertaking dwelling BPE

Module 4 - Data interpretation, reporting and taking action

Module 5 - The performance golden thread: BPE and robust QA

Modules are all freely available to download from the GHA Knowledge Base.

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01 Introduction

Building Performance Evaluation (BPE) enables us to move beyond predicted performance and understand how homes perform in use. The aim of these guides is to provide accessible learning about BPE to multiple stakeholders, especially those without specialist experience.

Module 1 explains what BPE is and why we need it, Module 2 discusses how to begin a BPE programme, and Module 3, describes how data is collected and analysed. This module, Module 4, explores what happens next: how we interpret data, communicate it to different audiences, and use it to take meaningful action. This stage is essential to quality BPE, it requires interpretation of data to determines the reliability and relevance of findings, and appropriate reporting of insights for different stakeholders is needed to ensure outcomes and lessons learned are identified.

This module is structured as follows:

- **Interpretation** – Guidance on reviewing data quality and identifying meaningful findings.
- **Reporting & Taking Action** – Persona-specific communication tips and next steps for each of the following groups:
    - **Occupants:** Tenants, homeowners, and shared ownership residents, along with the frontline staff who support them. They live with the outcomes of building performance and offer valuable feedback to drive accountability and learning.
    - **Landlords:** Councils, housing associations, and private landlords responsible for housing maintenance, compliance, and resident relationships. They connect occupants with technical teams and oversee building performance over time.
    - **Retrofit Teams:** Landlords and their delivery partners leading retrofit projects. They must ensure retrofit works are safe, effective, and meet funding or policy requirements.
    - **Housebuilders and Developers:** Contractors and developers involved in the construction and handover of new homes. Their work influences performance outcomes, design integrity, and long-term resident satisfaction.
    - **Wider Stakeholders:** Includes policy teams, planners, building control, consultants, architects, and BPE specialists. They use performance data for regulation, design improvement, and driving innovation across the sector.
- **Summary** – Persona summary table.
- **Appendix** – Useful standards and guides.

02 Interpretation: What does the data mean and is it robust?

Module 3 Recap: BPE Methods commonly include:

Quantitative methods often include:

- Energy & Environmental monitoring (e.g., energy use, temperature, humidity, CO_2 levels)
- Airtightness & ventilation measurements
- Thermal imaging, U-value & heat loss measurements

Qualitative methods typically include:

- Resident interviews, focus groups & Post-occupancy evaluation (POE) surveys
- Site observations, walkthroughs & document reviews

Data Robustness

Robustness check should establish if the data collection and resulting insights and recommendations are useful and reliable. These should ask if BPE methods followed a relevant **protocol** or previously validated methods to ensure transparent, repeatable process (e.g., BS40101, etc.). **Triangulation** between different types of BPE data, e.g., using environmental sensors alongside resident feedback to uncover hidden drivers of poor comfort, provides additional robustness. Robustness checks should also consider **data quality**, for instance:

- Were sample sizes sufficient and representative of the building / residents / population?
- Was monitoring undertaken over a full heating season to capture influences of varying weather patterns, occupancy patterns, and heating schedules.
- Are data gaps, anomalies or confounding variables clearly explained?
- Were sensors correctly installed and maintained?
- Were all relevant systems or rooms covered?
- Was there continuity between pre- and post-retrofit data?

Key Considerations for Interpretation

There are several key features of good interpretation. Firstly, it should be informed by the **BPE project goal**, i.e., Resolve a complaint? Verify a retrofit intervention? Support regulatory compliance? Diagnose a performance gap in a new build?

Additionally, it should explore and **communicate uncertainty** with the methods used and limitations associated with the findings and how this may influence the insights. BPE is not about perfection; all buildings are complex and lived-in spaces. A small sample of sensors or short monitoring period can still yield useful insight, if limitations are understood and clearly acknowledged.

Good interpretations should report results of **fair tests** ("apples with apples") and not, for instance, simplistically comparing monitored energy data against EPC predictions, without considering if the real life building the models had similar inputs or significant deviations in assumptions over occupancy, weather, fabric & system performance etc.

To avoid greenwashing, interpretation must report **limitations** and show it has not cherry-picked data or provided any misleading claims or conclusions. This includes clearly stating if there was some **data not collected** which may be needed to provide a holistic assessment of an issue. For instance, only collecting information on resident behaviour when investigating damp and mould may miss underlying fabric or services problems.

The limitations of a BPE project will also inform how a BPE project may be able to extrapolate **findings**. For instance, it may not be appropriate to extrapolate the findings from a single home to a block of flats, or other similar archetypes, but it may be possible to draw some general conclusions for a group of similar buildings, where a sub sample were assessed depending on if the BPE project was designed effectively for this purpose.

Interpretation also benefits from **benchmarking** results against recognised standards or frameworks, such as the Building User Survey, CIBSE TM63 (operational performance evaluation), or TM54 (design-stage energy use modelling) to set the findings in context.

Finally, it is important to ensure that findings are **transparent and reproducible**. This means providing clear metadata, naming conventions, data audit trails, and open documentation of assumptions, formulas, or tools used in the analysis. This transparency is key to preserving the integrity of the golden thread (Module 5) and enabling others to build on the work in the future.

Highlighting **lessons learned** for future construction and BPE projects is an important part of the reporting of BPE projects, for instance, clarifying if issues stem from design, installation, or user issues (where possible), where underperformance is observed suggesting further diagnosis steps.

03 Reporting & Taking Action

Once BPE data has been collected and interpreted, it needs to be effectively communicated and acted upon to drive meaningful action. This section focuses on how to present BPE findings to different audiences, enabling stakeholders to make informed decisions that improve building outcomes. Each group will have different needs, expectations, and responsibilities and as such, requires a different tone, format, and level of detail in reporting. General principles of effective communication include:

- Using accessible, plain language for non-technical audiences.
- Linking findings to practical consequences (e.g., comfort, cost, compliance).
- Offering clear next steps or recommended actions.
- Presenting both strengths and issues transparently.

Occupants

Occupants live with the outcomes of building performance every day. They feel the draughts, experience overheating, and suffer the consequences of mould or high bills so are one the most effective BPE tools available. As described in Module 3, data collection from occupants can include surveys, interviews, focus groups, and for tenants, reviews of maintenance requests and complaints. Combining lived experiences with other data helps determine root causes of problems and can identify where occupant management may be masking underlying issues, e.g., a home may be measured to be comfortable at the expense of excessive fuel bills masking poor fabric performance. Communicating results to occupants is therefore about empowering as well as informing and clear feedback builds trust and strengthens accountability. The best engagement is therefore reciprocal, and occupants should see the benefit of providing data.

Recommendations for communicating BPE to occupants include:

- Prioritise what matters most: health, comfort, costs, and safety.
- Keep materials short and accessible – e.g. one-page letters or SMS summaries.
- Avoid jargon and complex metrics, instead use visual aids.
- Use compassionate language (“National Tenant Engagement Standards” (TPAS, 2024)).
- Relate results to personal experiences e.g., "your home is losing more heat than it should"
- Offer follow-ups (home visits or resident forums) to explain results and feedback mechanism
- Explain how the BPE helps them e.g., monitoring damp or air-quality can hold landlords to account.
- Include actions that have been taken and what to expect next.

Landlords

All landlords, social, public or private, have responsibility for the health, safety, and efficiency of their homes.

BPE provides a mechanism to test and track performance, inform asset management, prove compliance with housing standards and laws, and provide evidence to investigate claims. Landlords already typically hold large datasets (asset registers, tenancy profiles, repair logs, complaints, etc.), which provide useful additional historical and contextual data which can inform BPE projects. These data sources also provide the potential for landlords to act proactively to avoid issues across their stock, rather than await failures and complaints. Ensuring BPE findings can integrate into these existing data platforms can therefore be an important consideration.

Any new BPE project represents an opportunity for landlords to communicate and interact with their tenants and so BPE should be designed in the context of existing communication strategies to take advantage of existing good practice or provide an opportunity to improve or establish new approaches to communication and feedback between tenants and landlords.

When interpreting BPE findings for landlords, additional consideration may therefore be needed to describe how the results impact specific landlord responsibilities and business models e.g., maintenance budgets, void times, health & safety, compliance with standards (Decent Homes Standard, EPC, Awaab's Law, or the Housing Ombudsman's service expectations). It is important therefore to consider how BPE findings may be translated into KPIs that are important to landlords (ROI, compliance with EPC legislation etc.).

The aim the BPE project will determine the strategies and approaches to communicating the findings to landlord, and this may range from technical reports to layperson summaries, benchmarking findings, or evaluating outcomes against standards. Recommendations for communicating BPE to landlords include:

- Provide summary data and a management summary.
- Avoid overly technical output and jargon.
- Use clear benchmarking (e.g. SAP scores, overheating thresholds).
- Provide raw data and description how data were collected for reference.
- Integrate results with existing asset management systems were possible (e.g. asset registers).
- Map BPE results to national and local policy (e.g. Decent Homes Standard, Awaab's Law etc.).
- Map BPE results to landlord KPIs.
- Translate insights to support business cases (e.g., ROI, risks, etc.).
- Identify next steps and recommendations for future BPE and tenant feedback.

Retrofit Teams

BPE undertaken **pre-retrofit** projects can help inform the design of the planned retrofit activities and provide baseline performance against which improvements are judged. These can form part of the retrofit assessments (e.g., BS40104) required under retrofit standards (e.g., PAS 2035). Additionally, BPE undertaken **during retrofit** projects can provide useful performance checks for instance assessing if air tightness targets have been achieved prior to completion. BPE **post-retrofit** is essential to evaluate if the intended outcomes (e.g., improved comfort, lower fuel bills) from retrofit projects have been achieved and provide evaluation against specific retrofit targets (e.g., kWh/m²/year) or if unintended consequences (e.g. condensation, overheating) have occurred. The final stage of BPE can often only take place after the works are completed and the home has been **occupied** for a period (e.g., a full heating season and summer), meaning the BPE project timelines need extending beyond the retrofit project timelines.

BPE is often a requirement of retrofits delivered via funded policies, e.g., Social Housing Decarbonisation Fund (SHDF) and the Energy Company Obligation (ECO) and in these instances interpretation and reporting should be framed around specific funding requirements. The scope of retrofit BPE required vary between retrofit policies, though all require some basic evaluation (e.g., occupant surveys), and so reporting BPE findings for retrofit projects should be interpreted in the context of which elements of performance and risk have not been included (e.g., baseline data, monitored data etc.).

More holistic evaluations are able to provide more detailed information around retrofit performance, for instance, combining monitoring data with occupant feedback may identify underperformance was linked to confusing heating controls rather than the retrofit measure itself. Where multiple measures have been retrofitted, it can be difficult to identify the benefit of the specific retrofit measures and this needs consideration in the design of the BPE project and the interpretation of the results, e.g., It may not be possible to determine how much improvement should be attributable to new insulation measures, or a new heating system, if these were installed in tandem. Recommendations for interpreting BPE for retrofit projects include:

- Integrate BPE milestones into retrofit delivery timelines and contracts.
- Align reporting with funding or policy requirements and frameworks (e.g., PAS 2035).
- Describe and illustrate pre- and post-performance (carbon savings, energy use, thermal images etc.).
- Report results against performance targets (kWh/m²/year, EPC band etc).
- Align results to support future retrofit business models (ROI, EPC requirements, mould risk etc.).
- Encourage collaborative review sessions between designers, installers, and landlords.
- Detail limitations of BPE and the implications for evaluating retrofit success (was baseline performance available? Was data modelled or measured?)
- Identify performance across different scales: the measure-level (U-value measurements, commissioning of MVHR etc), the dwelling-level (air tightness, energy use), and portfolio-level (EPC uplift strategies etc.).

Housebuilders

Historically, developers may have viewed BPE as a reputational or contractual risk, though it is now increasingly recognised as an essential component of a sustainable house building business model, and data-led assurance via BPE is increasingly expected from customers and regulators, and integrated into frameworks, such as Future Homes Standard, RIBA POE, Soft Landings, and BS 40101. For housebuilders, BPE during build and post completion, offers a mechanism to establish compliance against policy and standards, to identify issues with design, installation, or commissioning, and to move towards performance-led delivery.

Mid construction performance evaluations support continuous quality improvement and ensure accountability for performance across multiple trades and subcontractors.

Post construction BPE can help measure performance gaps between design and actually performance. Collectively these BPE can reduce costly errors, inform procurement decisions, result in fewer defects, better NHBC scores, and stronger brand differentiation.

Maintaining relationships and data sharing agreements with customers post-sale can provide an opportunity for housebuilders to extend BPE in new homes **post-occupation**, it can improve handovers, provide reassure for occupants of their home's performance, help occupants understand and manage their homes, and provide information to diagnose if issues related to user behaviour (which may indicate hand over processes were inadequate), or with the home, (which may indicate commissioning or QA processes needed improving).

Sharing lessons learned from BPE projects undertaken by different housebuilders, is a useful way to improve standards and share best practice, and embedding transparency and consistency into BPE plans will support the ability to compare between projects.

Recommendations for interpreting and reporting BPE for Housebuilders include:

- Align with RIBA POE, Soft Landings, and BS 40101 stages.
- Plan for BPE mid construction, post construction and post occupation.
- Emphasise business benefits: fewer complaints, higher satisfaction, reduced liability.
- Summarise insights into practical design and construction actions and QA feedback loops, e.g., "increase ventilation in south-facing bedrooms".
- Clarify ownership of actions (e.g. installer vs. developer) and propose cost-effective fixes.
- Highlight recurring issues across projects to inform standard detail updates.
- Provide comparative case studies showing predicted vs. actual outcomes.
- Ensure outputs are concise, visual, and practical.
- Link results to customer care strategies or "comfort guarantees."
- Triangulate across design data, BPE measurements, resident feedback, and commissioning reports.
- Report methods and findings transparently to support sharing lessons with the wider industry.

Wider Stakeholders

Wider stakeholders shape the environment in which building performance is understood and valued including, **policymakers, planners and regulators**. These groups use BPE to inform and validate standards, policy and targets, and to inform planning, building control, funding and other strategic decision-making and target setting across the built environment, and health and environmental sectors. Effective BPE allows this group to understand real-world outcomes (including assessing performance gaps) and evaluate policy, critical in an era of increasing concern around the impact of buildings on our health and wellbeing, and social, environmental and carbon targets. The extent to which they may use BPE varies from simply tracking EPC targets to being employed to unlock Community Infrastructure Levy (CIL).

Built environment professionals are also BPE stakeholders, designers and engineers can use it to refine specifications, validate modelling assumptions, and strengthen feedback loops in design practice. Peer-reviewed datasets also enable third-party analysis, helping to identify system-wide gaps or recurring performance issues. For wider stakeholders the sharing of BPE results from multiple projects to provide sector wide learning is particularly useful in identifying differences in performance across regions or policies or projects, and ensuring decisions are being taken in the context of best practice and consistency.

Each group has different priorities, however, general recommendations for interpreting BPE to wider stakeholders include:

- Provide accessible summaries where possible.
- Tailor results format to different levels (strategic, policy or project).
- Highlight key learnings for different contexts (dense urban vs rural, health vs carbon etc.).
- Report results in relation to the BPE aims (health outcomes, carbon savings, satisfaction etc).
- Incorporate multiple BPE metrics where possible and identify important metrics not provided.
- Use case studies to illustrate findings and describe their representativeness.
- Present results in context to other BPE projects or benchmark values
- Identify BPE methodologies and standards followed (e.g., TM61, GHA Net Zero Toolkit).
- Identify limitations in the BPE methods (e.g., only reporting modelled EPCs).
- Be transparent when reporting methods and metrics and where possible make data available to support sector wide learning.

04 Summary

At its heart, BPE is centred on assessing the performance of homes to check that homes are achieving their intended outcomes. This module has shown that robust interpretation and tailored reporting are essential to unlocking the full value of BPE.

Different end users of BPE may have slightly different requirements, and interpretations and reporting of BPE data should be informed adapt to the audience and the questions being asked to ensure BPE is being interpreted appropriately, clearly, transparently, responsible, and effectively. For instance, BPE should provide occupants with protection and reassurance, give landlords need information they need to make decisions, retrofit teams need diagnosis validation, developers improve QA and a better product, and wider stakeholders trusted evidence to make informed decisions.

Done well, reporting can transform how performance data is used: not just as a technical tool, but as a catalyst for decision-making, accountability, and continuous improvement.

This report provides practical guidance to inform how BPE findings can be interpreted and reported to a range of stakeholders, to promote the role of BPE in helping deliver healthy, comfortable, efficient and well performing homes.

05 Appendix

This table below summarises key tools, standards, and policies that support a consistent approach to building performance evaluation and quality assurance. Drawn from best practice and real-world delivery outlined in modules 1-4, these resources help stakeholders align their roles, make informed decisions, and strengthen trust. Together, they form the foundation of a people-focused approach to performance that bridges design, construction, occupancy, and retrofit.

Resource	Description and how it can be used
BPN Water Guide	Water efficiency and reuse in housing: Design guide for a changing climate has strong examples of effective visual communications (annotated images and graphs etc.)
BS 40101:2022	This is the primary BPE standard in the UK. It covers different levels of BPE (light, investigative, diagnostic), methods of evaluation, planning, and communication of results.
CIBSE Guides	CIBSE publishes numerous technical memoranda: TM22 Energy assessment & reporting methodology, TM46 Energy benchmarks, TM54 Evaluating operational energy performance of buildings at design stage, TM61 Operational Performance with accompanying TMs: • TM62: *Operational performance: Surveying occupant satisfaction* • TM63: *Operational performance: Building performance modelling and calibration for evaluation of energy in-use* • TM64: *Operational performance: Indoor air quality — emissions sources and mitigation measures*
Designed to Perform	An illustrated guide to designing and constructing better homes; Appendix 2 is useful for RIBA stages approach for the BPE Golden Thread.
Future Homes & Buildings Standards	This UK Government consultation proposes new performance requirements for new homes and non-domestic buildings, aiming to ensure they are "zero-carbon ready" once the grid fully decarbonises. It

	focuses on fabric efficiency, low-carbon heating, ventilation and real-world verification of performance, while retaining flexibility for developers and emphasising cost-effectiveness and deliverability.
Housing Fit for Purpose	The Good Homes Alliance defines what it means for a home to be truly usable, sustainable, and healthy. It aligns well with BPE by centring occupant experience and wellbeing as well as society as a whole
Housing Ombudsman 4-tests of good communication	Best practice communication guidance to help landlords avoid stigmatising residents (4 key ingredients for effective communication are timely, transparent, tailored and tone)
Housing Ombudsman Service - good practice consultation response (Centre for Learning hub)	Outlines sector-wide responses to proposed good practice guidance for landlords. Highlights the importance of proactive, resident-focused approaches to repairs, communication, and performance monitoring. Emphasises learning from complaints data and embedding accountability through transparent processes and engagement.
PAS 2030	British Standard that specifies the requirements for installing energy efficiency measures in existing buildings.
PAS 2035 Retrofitting Dwellings	British Standard Code of practice for the energy efficiency retrofit industry
Recent residential legislation	The Renters (Reform) Bill, also known as the Renters' Rights Bill, is a piece of legislation aimed at reforming the private rented sector in England. The Social Housing (Regulation) Act 2023 is a UK law designed to improve the quality and safety of social housing
RIBA's POE Overlay	RIBA integrates BPE touchpoints into each stage of the Plan of Work, ensuring performance is tracked from start to finish.
Soft Landings	BSRIA, Soft Landings provides a structured process to bridge design and operation, keeping the project team involved post-handover to smooth the transition, embed learning and optimising performance.
State of the nation review: Performance evaluation of new housing	A good example of sector-wide evidence gathering across the UK, highlighting key barriers, emerging trends, and opportunities for improving building outcomes through more consistent evaluation, making it a foundational reference for anyone shaping BPE policy or practice.
The Building Performance Hub	The Good Homes Alliance and Building Performance Network resource hub provides a lifecycle view of performance evaluation. This collection of resources (including the BPN Wheel) encourages integration of BPE from early design through to in-use monitoring, supporting joined up thinking across all stages and stakeholders

The Innovate UK BPE Programme	Case Studies: lays the groundwork for much of today's BPE practice, funding in-depth studies and creating a strong evidence base for best-practice.
UK Net Zero Carbon Building Standard	Collaboration between CIBSE, BBP, BRE, the Carbon Trust, IStructE, LETI, RIBA, RICS, and UKGBC—this free-to-access technical standard offers a clear and consistent methodology for defining and achieving net zero carbon in the built environment.

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